

Claims:

1. **A method for manufacturing, forming or creating** at least one dielectrically insulating trench (10) comprising rounded edges (14) of active silicon layer portions (6,7;3) adjacent to the trench, each of said rounded edges (14) located at a respective transition area (14) connecting to a buried insulating layer (2) of an SOI structure, said method comprising
 - 5 performing an etch process consisting of two steps, wherein
 - in the first step of the etch process said trench (10) is etched to the insulating layer (2);
 - in the second step of the etch process under-etched regions (12) are formed on (both) sidewalls of the trench (10) by isotropically etching a part of the insulating layer (2);
 - 10 after performing said etch process thermally oxidising surfaces of said trench (10) and said under-etched regions (12).
2. The method of claim 1, wherein said insulating layer (2) is used as an etch stop layer during said first step.
3. The method of claims 1 or 2, wherein in said second step a material removal at both sidewalls of the at least one trench (10) is small due to a selectivity of the isotropic etching, thereby substantially not resulting in a rounding of upper and lower edges of the trench (10).
- 20 25 4. The method of claim 3, wherein the material removal at the respective two sidewalls (10b) does not result in a rounding of upper and lower edges of the trench (10) and is substantially zero.
5. The method of claim 1 or 2, wherein the thermal oxidation is performed for creating the insulating layers (13) on the vertical walls (10a) of the isolation trench (10) and on surfaces (10b) of the under-etched regions (12).
6. The method of claim 1, wherein the buried insulating layer (2) is an SiO₂ layer.

7. **A method for creating** dielectric insulating trenches comprising rounded edges (14) of active silicon layer portions (6,7) at a transition area or at the respective transition area connecting to a buried insulating layer (2) of an SOI structure, comprising
- 5 after etching at least one of the isolation trenches (10), isotropically etching said buried insulating layer (2) so as to form under-etched regions (12) in the buried insulating layer (2); and subsequently performing a thermal oxidation for creating an insulating layer (13) on vertical walls (10a) of the isolation trench (10) and in particular also on surfaces (10b) of the under-etches regions (12) so as to form rounded edges (14) of the insulating layers (13) above the edges (15) in the transition areas.
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8. The method of claim 7, wherein the buried insulating layer is a SiO₂ layer.
9. The method of claims 7 or 8, wherein during the isotropic etching a material removal at the respective two sidewalls does not result in a rounding at upper and lower edges of the trench (10) and is substantially zero.
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10. **SOI wafer** comprising at least one and preferably a plurality of dielectrically insulating trenches (10) having rounded edges (14) formed of active silicon layer portions (6,7;3) located adjacent to the trench, said rounded edges (14) located at a respective transition area (14) connecting to a buried insulating layer (2), said SOI wafer formed or being formable according to any of the preceding methods.
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